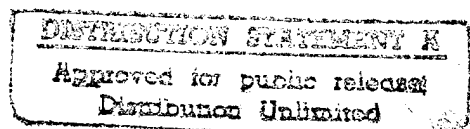


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Security From Land-Attack Cruise Missile Threats: Considerations For the Operational Commander

by

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Major, USAF



A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

12 February 1996

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ABSTRACT

To satisfy national security requirements, the United States will increasingly find itself faced with deploying American combat forces in response to major regional contingencies. At the operational level, it is inevitable that U.S. operational commanders will contend with one or more hostile powers intent on threatening order and stability using advanced weaponry. With proliferation of land-attack cruise missiles, the operational commander is now faced with a ever burgeoning, and quite capable threat to his forward deployed forces. As with any other military threat, once recognized and validated, careful planning must be accomplished to mitigate the potential effects. Currently, the United States continues to place emphasis on neutralizing the tactical ballistic missile threat to forward deployed forces. But, the tide is turning, and many third world players are acquiring cruise missiles to replace or complement their ballistic missile inventories. Thus, the operational commander must fully recognize this threat and accomplish effective planning within the framework of current joint theater missile defense doctrine to obviate it. If planning and subsequent execution of defensive measures are inadequate, security of friendly forces will falter, and the maxims of maneuver, economy of force, mass, offensive, and surprise will suffer along with overall combat effectiveness of assigned forces. Consequently, achievement of the operational objective, and in some cases, the strategic objective will be threatened.

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The proliferation of cruise missiles has taken an ominous turn with the increased interest of a number of nations in land-attack versions, a development that would allow these countries to strike with cheap, powerful, and relatively accurate tactical weapons across a battlefield spread over hundreds of miles.¹

Introduction:

Due to the increased availability of land-attack cruise missiles to determined and hostile regional powers, these weapons must be considered as threatening to forward deployed friendly forces as theater ballistic missiles. Consequently, when conducting operational planning, the operational commander must seriously consider security relative to protecting his forces, and understand how this tenet affects other principles of war. Security, commonly recognized as one of the principles of war, is plainly defined in U.S. Army Field Manual 100-5 in the following manner:

Never permit the enemy to acquire unexpected advantage. Security enhances freedom of action by reducing vulnerability to hostile acts, influence, or surprise. Security results from the measures taken by a commander to protect his forces. Knowledge and understanding of enemy strategy, tactics, doctrine, and staff planning improve the detailed planning of adequate security measures...Protecting the force increases friendly combat power.²

In planning and executing operations, the operational commander must take proactive steps to ensure his forces adhere to this maxim. This can be communicated to subordinates as part of commander's intent through the operational planning mechanisms (i.e., campaign plan, commander's estimate, operations order, etc.). If security of one's own forces is not assured, then other critical aspects of combat capability (e.g., maneuver, objective, economy of force, and mass) will undoubtedly suffer. So, if the operational commander successfully

¹ David A. Fulghum, "Cheap Cruise Missiles a Potent New Threat," Aviation Week and Space Technology 6 September 1995, 54-55.

² U.S. Department of the Army, Operations, FM 100-5 (Washington, D.C., 1993), 2-5.

protects his forces from cruise missile attacks, he can increase the likelihood they will operate to their full combat potential.

According to the Missile Technology Control Regime (MTCR), a multinational agreement to curb missile proliferation, cruise missiles are defined as unmanned, aerial vehicle systems capable of delivering at least a 500 kilogram payload more than 300 kilometers.³ The purpose of this paper is to analyze the current and projected land-attack cruise missile threat to forward deployed forces, show why it is vitally important for the operational commander to ensure these assets are protected from such threats, and provide some recommendations to help the commander in combating this emerging threat.

National Strategic Requirements:

The focus of President Clinton's National Security Strategy of Engagement and Enlargement is our ability to fight two Major Regional Contingencies (MRCs). Current national security strategy calls for the United States to continue its role as world leader by "enlarging the community of market democracies while deterring and containing a range of threats to our nation, or allies and our interests."⁴ To support these commitments in an era of decreased overseas presence, U.S. crisis response forces are expected to deploy and exercise power projection in support of regional contingency operations. These forces will need to establish forward bases, during which they will be most vulnerable to preemptive attacks or operational fires from a hostile regional power. Furthermore, even if friendly forces are not significantly harassed during build up operations (i.e., Desert Shield), once hostilities begin, they can reasonably expect to come under attack by any number of theater weapon systems,

³ W. Seth Carus, Cruise Missile Proliferation in the 1990s (Westport, CT: Praeger, 1992), 89.

⁴ U.S. President, A National Security Strategy of Engagement and Enlargement (Washington, D.C.: The White House, 1995), 7-9.

to include cruise missiles. Perhaps even more frightening is the prospect of dealing with weapons of mass destruction (e.g., nuclear, biological, chemical).⁵

Emphasis on ballistic missile mitigation:

Although the Scud missiles launched during Desert Storm successfully served their political intent as terror weapons against friendly force rear areas and coalition population centers, from a military standpoint, they were not a very significant threat. The Scud's poor weapon system accuracy, combined with Iraqi use of conventional warheads, and their rather low missile launch rates serve to explain this observation.⁶ However, in the next conflict, U.S. military forces may not have the luxury of fighting a fairly unsophisticated adversary, wielding a nearly obsolete weapon system. Indeed, in the next major regional conflict U.S. forces and more likely, coalition forces, may face an opponent armed with more militarily capable weapons. These weapons may come in the guise of more advanced ballistic missiles, but more likely the next opponent may use the cruise missile to threaten friendly forces.

Although Scuds were not militarily effective, following the Gulf War a tremendous amount of time, effort, and funding has been devoted to theater ballistic missile defenses. Congress reacted to the sight of civilian casualties by rushing the Missile Defense Act of 1991 into law. This legislation reinforced the notion that the preeminent missile threat is the ballistic missile.⁷ However, based on increased worldwide interest in acquiring land-attack cruise missiles, the USAF 1993 Cruise Missile Vulnerability Study argues that developing

⁵ For a detailed look at WMD impacts on theater operations and planning, see: Kehler, C. Robert. "Facing A Nuclear Armed Adversary in a Regional Contingency: Implications for the Joint Commander." Newport, RI: U.S. Naval War College, 16 May 1995.

⁶ Kevin E. McHugh, "Ballistic Missile Defense: Putting a 'Roof' Over Our Forces in the Theater," Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994, 1.

⁷ "Cruise Control," Air Defense Artillery September-October 1992: 16-17.

an effective means to defend against cruise missiles may be just as important as the ongoing efforts to develop theater ballistic missile defenses.⁸

In terms of demonstrated capabilities, we only have to look at the performance of American Tomahawk cruise missiles during the Gulf War. Their success validated the role of land-attack cruise missile effectiveness in executing operational fires. Even more astonishing were the publicly released film footage of battle damage that underscored the accuracy, lethality, and survivability of the cruise missiles as they attacked Iraqi targets. Surely, one would be foolhardy to believe our potential adversaries were not equally impressed, and thus convinced that these systems represent the wave of the future.

Few would argue that ballistic missiles are not a continuing threat to forward deployed forces, but the operational commander must take a broader look and examine the ever-increasing inclination to acquire land-attack cruise missiles and their related technologies.

Motivations and sources:

For a number of reasons, cruise missiles may present an attractive option for many countries. They tend to be simpler to build than ballistic missiles, assuming the country in question has the basic ability to produce, modify, or reverse engineer subsonic airframes and propulsion systems. Use of weapons of mass destruction in cruise missile warheads reduces the requirement for precision guidance in the overall design. In fact, many developing nations already possess airframes that can be used as cruise missiles. Target and reconnaissance drones, air-launched decoys, obsolete aircraft, and anti-shipping cruise missiles are but a few of the airframes that can be modified for the land-attack role.⁹

⁸ U.S. Air Force, Cruise Missile Vulnerability Study, Volume 1-Historical Vulnerability Review (Ft Walton Beach, FL: 1993), 3-1.

⁹ W. Thomas Wander and Eric H. Arnett, The Proliferation of Advanced Weaponry: Technology, Motivations, and Responses (Washington, D.C.: AAAS, 1992), 105-106.

There are at least 17 countries with the technical ability to develop and, perhaps even more telling, export cruise missiles or their related technologies.¹⁰ One can argue chemical and biological warheads are easier to deliver by cruise missiles than by ballistic missiles, and high explosive warheads are more accurately delivered on point targets using cruise missiles. A counterargument to this assertion is that low flying missiles may be easier to intercept than ballistic missiles, but supersonic cruise missiles, capable of pre-programmed maneuvers are already entering service (i.e., Chinese CSSC-6, French ASMP), thereby posing more significant problems for defenders.¹¹

Typically, nations intent on obtaining land-attack cruise missiles will try to buy them from foreign suppliers. If the systems can not be bought outright, then cruise missile development may follow the same pattern that emerged with ballistic missile proliferation. Under these circumstances, the interested party produces them indigenously after acquiring the necessary technology.¹²

The nature and extent of the cruise missile threat to our military forces are undergoing change worldwide. In the early 1990s, the cruise missile inventories of the Soviet Union and the People's Republic of China (PRC) represented the principal threat. Following the Soviet Union's breakup, her inventory of land-attack cruise missiles did not just go away. These missiles are now under the control of a number of individual and somewhat unpredictable players--the Commonwealth of Independent States (CIS). Hence, these states represent a significant potential source of weapons for hostile regional powers.¹³

¹⁰ "Treaties Fail to Stem the Threat," Jane's Defence Weekly 16 July 1994: 20.

¹¹ Ibid, 20-21.

¹² Carus, 32-33.

¹³ Cruise Missile Vulnerability Study, Volume 1-Historical Vulnerability Review, 1-2.

Comparison and synergy:

Inevitably, comparisons are drawn between tactical ballistic missiles and land-attack cruise missiles. In design terms, one can argue that cruise missiles are more versatile than ballistic missiles. They can be launched from a variety of vehicles, ramps, naval vessels, as well as a myriad of aircraft. Even comparing cruise missiles and tactical ballistic missiles with similar payloads and ranges (i.e., BGM-109 Tomahawk and CSS-5), we can see that the cruise missile has a launch weight of only approximately 10 percent that of the ballistic missile.¹⁴ The technologies required to design, build, and deploy cruise missiles vice ballistic missiles are less advanced and more readily available to countries with a light aircraft manufacturing capability. Besides, the availability of Global Positioning System (GPS) receivers weighing approximately 5 kilograms and costing approximately \$5000 will surely increase cruise missile accuracy regardless of range flown.¹⁵ The result is a cruise missile that has a similar warhead size, delivered over a similar range (Figures 1 and 2), and with more accuracy than an equivalent ballistic missile. In terms of actual dollar figures, some analysts believe the average cost of a cruise missile is approximately \$100,000, or one-tenth the cost of a typical ballistic missile.¹⁶

¹⁴ Duncan Lennox, "Cruise: A Missile for the '90s," Jane's Defence Weekly 7 May 1994: 19-20.

¹⁵ Ibid, 19.

¹⁶ William C. Story, Jr., Third World Traps and Pitfalls: Ballistic Missiles, Cruise Missiles, and Land-Based Airpower, diss., Air University, 1995 (Maxwell AFB, AL: Air University Press, 1995), 35.

*Figure 1: Cruise Missile Programs in Service and in Development*¹⁷

Weapon System	Payload (kg)	Max Range (km)	User countries
BGM-109 Tomahawk	450	450/2500	USA
SS-N-3 Shaddock/Sepal	1000	450	Angola, Bulgaria, Russia, Serbia, Syria, Ukraine
AS-15 Kent	300	3000	Russia, Ukraine
AGM-129 ACM	450	3000	USA
Yakhont/Bastion	**	300	Russia
CSSC-2 Silkworm variant	500	450	Iran
Ababil	300	500	Iraq
Unknown	**	600	China
Unknown	**	600	India
Alfa	400	600	Russia
** Unknown			

*Figure 2: Short-Range Third World Ballistic Missiles*¹⁸

Weapon System	Payload (kg)	Max Range (km)	User countries
Nazeat	130	300	Iran
SS-1 Scud B	300	985	Algeria, Egypt, Iran, Iraq, Libya, Syria, North Korea, Vietnam
Al Hussein	650	500	Iraq
Hatf I	80	500	Pakistan
Prithvi	250	1000	India
Scud C	650	500	Egypt, Iran, Iraq, Libya, North Korea, Syria

Furthermore, while no countries are discarding their ballistic missile programs, many are simply augmenting their existing ballistic missile arsenals with cruise weapons, thereby creating a very viable dual threat phenomenon for our forward deployed forces. While most of the cruise missiles available to third world nations do not have the pinpoint accuracy of the U.S.-built Tomahawk, specialized submunitions and accuracy down to 100 meters or less (using commercially available GPS) make them very effective.¹⁹

¹⁷ Lennox, 20.

¹⁸ Bill Gertz, "Scud's Bigger Brothers," *Air Force Magazine* June 1994: 52.

¹⁹ "Cheap Cruise Missiles a Potent New Threat", 54-55.

Future Threats:

Current French and Chinese cruise missile development exemplify the nature of the emerging threat. For example, the French are currently marketing their Super Apache land-attack cruise missile as a high end product. The Super Apache is capable of flying in all weather conditions except heavy rain. Warheads and submunitions are optimized for various target types (e.g., fixed, moving, or hardened). In other words, using submunitions, this weapon system could find a target rich environment of soft targets during lodgment operations: airfields, aircraft, port facilities, troop barracks, and troop concentrations. The French are also selling a modified AM-39 Exocet anti-shipping missile for the land-attack role. Many of the 120 nations currently operating the AM-39 Exocet are prime customers for the land-attack version.²⁰

The French are also demonstrating another cruise missile advancement with their Aerospatiale Asura cruise missile, a version of their nuclear land-attack missile. But, unlike conventional cruise missiles, this weapon will not employ a stealthy/low/slow flight profile. Instead it will fly at over Mach 3, and use 15 G maneuvers and a 45 degree straight dive onto its target from high altitude (approximately 65,000 feet), making detection by a downward-looking Airborne Warning and Control System (AWACS) aircraft, and interception very difficult.²¹ Although intended for sale to the Royal Air Force, it is reasonable to expect the French to sell the Asura to other, less than friendly nations, for use against friendly forces in future conflicts.

On the other hand, Chinese missiles will dominate the low end of the cruise missile market spectrum. While the missiles exported by China are expected to be large and crude

²⁰ Story, 36.

²¹ Eric H. Biass and Doug Richardson, "Unmanned Bombers," Armada International December 1994-January 1995: 19-20.

for the time being, they also are expected to be reasonably accurate, and some versions are expected to have low observable (e.g., stealth) characteristics by the early 2000s. These improvements are expected to include heat signature reduction and radar absorbing materials. Some have argued that Syria, Iran, and China will all have cruise missiles with some low observable or stealth capabilities by 2000-2010. Stealth technology is the "next market" in the cruise missile proliferation game.²² As we have seen demonstrated by the F-117 fighter, a weapons delivery platform that incorporates stealth is a genuine force multiplier.

Governing Joint Doctrine

Following Desert Storm, Joint Publication 3-01.5, Doctrine for Joint Theater Missile Defense was written to address the tactical missile threat. In this directive, tactical missiles are defined as ballistic, air-to-surface, and cruise missiles whose targets are in the theater of operation.²³ Furthermore, Joint Publication 3-01.5 ascribes a four-part framework for integrating missile defense capabilities into the operational commander's operation or campaign plan. These four measures are defined as follows:

a. Passive Defense: These measures are initiated to reduce vulnerability and to minimize the effects of damage caused by a missile attack. They include: early warning and nuclear, biological, and chemical protection, operational and tactical deception, camouflage and concealment, hardening, OPSEC, and dispersal.²⁴

b. Active Defense: These operations are initiated to protect against missile attacks by destroying airborne launch platforms and/or missiles as they ingress to friendly targets.²⁵

²² "Cheap Cruise Missiles a Potent New Threat", 54-55.

²³ U.S. Joint Chiefs of Staff, Doctrine for Joint Theater Missile Defense, Joint Pub 3-01.5 (Washington, D.C., 1994), I-2.

²⁴ *Ibid*, III-4.

²⁵ *Ibid*, III-8.

c. Attack Operations: During these operations, counterforce actions are introduced to prevent launch of cruise missiles by attacking launch platforms and their supporting command, control, and communications, logistics support structures, reconnaissance, surveillance, and target acquisition (RSTA) platforms.²⁶ Attack operations concentrate on seizing and maintaining the initiative and are the most offensive missile defense options available to the commander.

d. Command, Control, Communications, Computers, and Intelligence (C4I): C4I is an integrated system of doctrine, procedures, organizational structures, facilities, communications, computers, and supporting intelligence for missile warning and defense systems cueing.²⁷ This measure links the other three efforts into a "coherent whole" and combines missile defense efforts with other operations occurring in the theater.²⁸

So, to protect his forces from cruise missile threats, effectively execute the campaign or operations plan, and achieve his major objectives, the operational commander must carefully preplan security of his forces. This is especially critical before embarking on mobilization, deployment, and base establishment operations. Ideally, planning should take place during peacetime with emphasis on achieving unity of effort from all assigned forces. But, if planning is less than adequate, how can this affect security and subsequently affect other principles of war?

²⁶ Ibid, III-11.

²⁷ Ibid, I-4.

²⁸ Frank J. Caravella, "The Army's Role in Theater Missile Defense," Air Defense Artillery November-December 1995: 6.

Bottom line--why is this so important?:

Tactical missiles could be used throughout the conflict against tactical, operational, and strategic targets to disrupt offenses, defenses, and their support, and to reduce friendly military capabilities.²⁹

As stated earlier, the basis for establishing an effective defense against land-attack cruise missiles is to provide security for friendly forces. If friendly forces can operate in a benign environment, then the operational commander increases his combat capabilities within the given theater. However, if security is not adequately planned for and executed, then other principles of war will suffer in the following manner:

a. Objective: If friendly forces are harassed by cruise missile threats, then achieving the principal military objective will be adversely affected, derailed, or perhaps forestalled indefinitely. Therefore, it is critical that the enemy's land-attack cruise missile threat is neutralized, as early as possible following commitment of U.S. forces to a regional contingency. This is accomplished using an appropriate mix of the four defensive measures (e.g., passive, active, attack operations, C4I). Once this occurs, friendly forces can more readily pursue the commander's objective with vigor.

b. Maneuver: In the operational sense, maneuver is the means by which the commander determines when and where to fight by setting the terms of battle, taking advantage of tactical actions, or simply declining battle.³⁰ To facilitate maneuver or freedom of movement, friendly forces must exercise battlespace dominance. But, in order to accomplish battlespace dominance, they must be as secure as possible. In maneuver warfare, the commander must continually balance movement, firepower, and protection of forces to fully dominate the

²⁹ Joint Publication 3-01.5, I-7.

³⁰ U.S. Department of the Army, Operations, FM 100-5, 2-5.

battlefield.³¹ If a campaign plan calls for massing forces to achieve the objective, then these forces must be free to maneuver.

c. Economy of force and mass: If the operational commander does not accomplish advanced planning for defending his forces during contingency operations, he will likely pay the price later. In terms of economy of force, this means he may later find himself allocating forces in a less than optimal manner to secondary efforts (e.g., delays, deception, retrograde operations) to react to the enemy's will and initiative. In this case, the commander surrenders the initiative. On the other hand, and more importantly, if he has not planned accordingly the commander may not be able to mass his forces due to impending cruise missile attacks. He may find that due to cruise missile attacks he cannot employ overwhelming combat power at the decisive point. From the Desert Storm experience, we saw that over 3,000 previously unplanned and unforeseen air sorties were flown during a 43-day period to attack Scud launchers.³² These "Scud Hunting" missions had an impact on the coalition air effort as aircraft, command and control, and logistical assets were taken away from the main effort of the war.³³

d. Offensive: One of the premises of the offensive is the ability to gain and maintain the initiative. If friendly forces are mired in a principally defensive mode due to poor planning (e.g., lack of sound intelligence on enemy cruise missile capabilities), then achieving the initiative and going on the offensive are much harder to obtain. However, during lodgment operations, friendly forces may have to maintain a more defensive posture as a temporary measure until the right force mixture is in place. So, this idea has more relevancy once hostilities have begun.

³¹ Barbara Starr and John Boatman, "Shaping the Future of the Traditional Battlefield," Jane's World of Defence December 1995: 97.

³² Caravella, 7.

³³ Story, 1-2.

Recommendation: Plan for cruise missile defense:

Prior planning is the key to security and should consider all the operational disciplines: operations, intelligence, logistics, and C4. There are some key considerations that should go into the planning process. They will include, but are not limited to the following:

a. Ensure all four missile defense measures against land-attack cruise missiles are addressed in appropriate operations orders for the given theater. In turn, the operational commander must ensure this information has been clearly disseminated down to all component and tactical levels. But, how will the commander test this process? Joint and combined exercises are logical forums for validating the adequacy of the operational commander's cruise missile defense planning. For instance, U.S. Atlantic Command recently hosted *Roving Sands*, a combined tactical missile and air defense exercise. Although quite successful, the exercise yielded many lessons learned applicable to force planning. All U.S. services as well as Dutch and German contingents participated, "working and coordinating together to have the right force package available for any contingency requirement."³⁴

b. Firmly establish U.S. national intelligence collection platform support. Intelligence Preparation of the Battlefield (IPB) prior to entry into a theater is essential to understanding the current nature of the threat.³⁵ For instance, properly fused overhead imagery can give the operational commander and his staff those critical Essential Elements of Information (EEIs) regarding a hostile regional power's intentions. Also, once friendly forces are bedded down in theater, national collection and RSTA platforms can bolster an operational commander's continuing defensive measures provided this support has been coordinated.

³⁴ Joris Janssen Lok, "Turning Theory Into Practice," International Defense Review August 1995: 34.

³⁵ Joint Publication 3-01.5, III-1.

c. Develop a prioritized list of friendly assets that will be defended during the various stages of operations.³⁶ Of course, the operational commander will have a firm idea which assets are most critical to prosecution of his operation or campaign plan. For instance, if tactical air assets are crucial to achieving leverage and success of the campaign plan, then strike aircraft and crews represent a critical vulnerability and would require a preponderance of missile defense protection.

d. Ensure all communications supporting cruise missile defense are part of a seamless operation that possesses robustness, redundancy, and interoperability for friendly forces. These factors are applicable in both the joint and combined environments. Communications are always critical to successful mission accomplishment and are critical to keeping forces apprised of threatening situations (e.g., tactical warning) and implementation of defensive measures (e.g., dispersal orders). Along with providing critical attack warning, these same communications capabilities provide the necessary information to update subordinate commanders regarding counterforce (attack) options.

e. Closely related to communications is the idea of unity of command. In any military operation where personnel are likely to assume a defensive posture against attack (e.g., lodgment operations), there is a high potential for chaos when attack is imminent. Confusion can adversely affect unity of command and undermine the operational commander's authority. Therefore, it is very important for the operational commander to stress centralized command to his forces, even when they face an imminent or actual cruise missile attack. This may be easier said than done, but does not excuse the commander from aggressively stressing this requirement during the peacetime planning process. Failure to do so can degrade combat capability.

³⁶ Ibid, III-1.

f. Establish and disseminate clear rules of engagement (ROE) as early as possible, with special emphasis on lessening the chances of fratricide occurring to friendly airborne assets that could be confused with in-bound cruise missile threats. Avoiding fratricide helps ensure continuing trust among other unit, service, and coalition members and helps foster unity of effort. Of course, rules of engagement should not be so restrictive as to cause undue hesitation by friendly forces as they are accomplishing cruise missile defensive operations. For example, unclear ROE and hesitancy on the part of the U.S.S. Stark crew may have led to her being struck by an Iraqi Exocet missile.

Maj Gen Harry W. Jenkins, Jr., USMC (Ret) captured the criticality of sound operational planning for successful force projection operations by stating:

*While it is clear that a combined TBM and cruise missile threat to an amphibious force might be a worse case scenario, Navy and Marine commanders could be ordered to execute a variety of amphibious power projection missions in the face of such a threat and must be prepared.*³⁷

Conclusions:

The question is not if U.S. forces will face a threat from land-attack cruise missiles, but rather when and where. Based on the increasing trend towards fielding these weapons, with or without complementary ballistic missiles, one can assume that the next regional contingency will be a more serious affair than Desert Storm. Indeed, the next foe U.S. forces face will have the benefit of lessons learned from the Gulf War--attack before our forces establish firm bases ashore, and attack by all available means, to include land-attack cruise missiles. The operational commander must make sufficient plans during peacetime to bolster security of his forces as they participate in force projection actions around the world. In doing so, he facilitates adherence to other principles of war, and increases his chances for operational success in support of our national security objectives.

³⁷ Harry W. Jenkins, Jr., "Theater Ballistic Missile Defense: The Enabler for Operational Maneuver From the Sea for the 21st Century," Marine Corps Gazette July 1995: 28.

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